TECHNICAL SERVICE MANUAL

CORKEN VANE PUMPS
SERIES CPBN, CPBF, CPGN & CPGF

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INTRODUCTION

The illustrations used in this manual are for identification purposes only and should not be used for ordering parts. Secure a parts list from the factory or a Corken representative. Always give a complete name of part, part number and material with the model and serial number of the pump when ordering repair parts. The unmounted pump or unit model and serial number can be found on nameplate secured to the pump.

In the Corken Vane Pump model number system, the basic series letters are combined with the size numbers to indicate the pump model size and construction. A full description is shown on page 2 (Figure 4).

This manual deals only with Corken Vane Pump series CPBN, CPBF, CPGN and CPGF. Refer to Figures 1 through 5 for general configuration and nomenclature used in this manual. Pump specifications and recommendations are listed in Catalog Section IP.

SPECIAL INFORMATION

ROTATION:

Pump rotation direction is indicated by an arrow cast on the casing. Pump should not be run in reverse rotation.

PRESSURE RELIEF VALVES:

1. Vane Pump series CPBN and CPGN (Cast Iron external) pumps are standard with built in pressure relief valves. Series CPBF and CPGF (Ductile Iron external) pumps are not available with an internal relief valve.

2. Pumps not furnished with a relief valve must be provided with some means of pressure protection (inline pressure relief valve, torque limiting device, etc.).

3. Pressure relief valves cannot be used to control pump flow or regulate discharge pressure.

FIGURE 1
SERIES CPBN Pumps Cast Iron Externals (size 0721 shown)

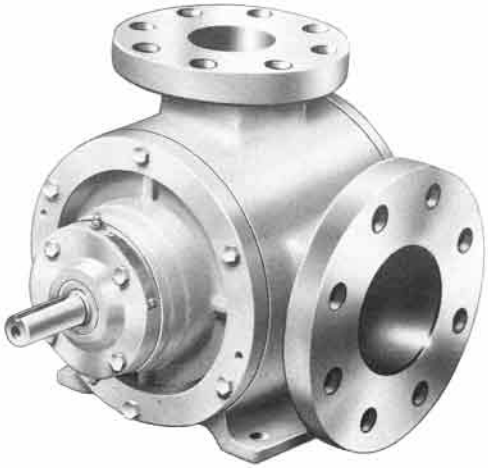

FIGURE 2
SERIES CPBF Pumps Ductile Iron Externals (size 1521 shown)

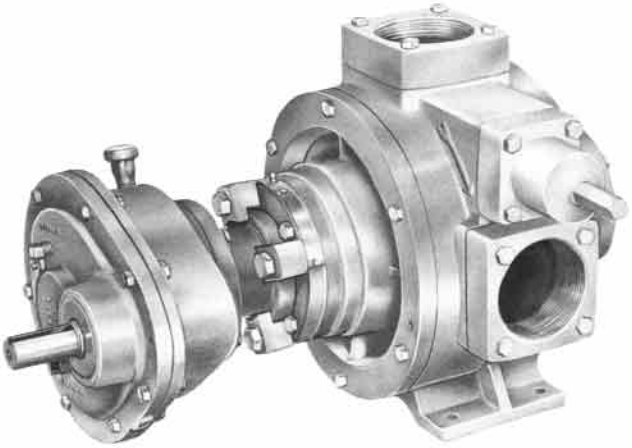

FIGURE 3
SERIES CPGN Unmounted Pumps with Integral Mounted Gear Reducer (size 1021 shown)

CORKEN VANE PUMP SERIES NUMBERS/AVAILABILITY

C P B N 1521 R A M R

CP = CORKEN INDUSTRIAL VANE PUMP

DESIGN TYPE:
B = Roller Bearing/Mechanical Seal/ Standard Shaft
G = Roller Bearing/Seal/Splined Extension for Integral "B" Size Reducer

EXTERNALS AND PORTING:
N = Cast Iron with NPT Ports
F = Ductile Iron with 300# Flanges

PUMP SIZES AND NOMINAL CAPACITIES:

0521	100 GPM @ 950 RPM
0721	155 GPM @ 950 RPM
1021	190 GPM @ 780 RPM
1321	255 GPM @ 780 RPM
1521	400 GPM @ 780 RPM

VANE MATERIALS:
R = Ryton® Vanes with Solid Push Rods

O-RING MATERIAL:
A = Buna N (Standard)
B = Neoprene
D = Viton®
E = Teflon®
G = Ethylene Propylene
L = Viton® Seal, all other O-Rings Buna-N
M = Teflon® Seal, all other O-Rings Buna-N
N = Teflon® Seal, all other O-Rings Viton®

① **PORT SIZES AVAILABILITY INLET AND OUTLET:**

A = 1½" x 1½"	E = 2½" x 2"	J = 3" x 2½"
B = 2" x 1½"	F = 2½" x 2½"	K = 3" x 3"
C = 2" x 2"	G = 3" x 1½"	L = 4" x 3"
D = 2½" x 1½"	H = 3" x 2"	M = 4" x 4"

ROTATION:
R = Right Inlet (Clockwise Rotation) (STANDARD)
L = Left Inlet (Counter Clockwise Rotation)

① Not all port sizes available in all pump sizes, see Catalog Section 450 for standard ports.

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FIGURE 4

DANGER

BEFORE OPENING ANY CORKEN PUMP LIQUID CHAMBER (PUMPING CHAMBER, RESERVOIR, RELIEF VALVE ADJUSTING CAP FITTING, ETC.) BE SURE:

1. THAT ANY PRESSURE IN CHAMBER HAS BEEN COMPLETELY VENTED THROUGH SUCTION OR DISCHARGE LINES OR OTHER APPROPRIATE OPENINGS OR CONNECTIONS.
2. THAT THE DRIVING MEANS (MOTOR, TURBINE, ENGINE, ETC.) HAS BEEN "LOCKED OUT" OR MADE NON-OPERATIONAL SO THAT IT CANNOT BE STARTED WHILE WORK IS BEING DONE ON PUMP.
3. THAT YOU KNOW WHAT LIQUID THE PUMP HAS BEEN HANDLING AND THE PRECAUTIONS NECESSARY TO SAFELY HANDLE THE LIQUID. OBTAIN A MATERIAL SAFETY DATA SHEET (MSDS) FOR THE LIQUID TO BE SURE THESE PRECAUTIONS ARE UNDERSTOOD.

FAILURE TO FOLLOW THE ABOVE LISTED PRECAUTIONARY MEASURES MAY RESULT IN SERIOUS INJURY OR DEATH.

MAINTENANCE

Corken Vane Pumps are designed for long, troublefree service life under a wide variety of application conditions with a minimum of maintenance. The points listed below will help provide long service life.

LUBRICATION: External lubrication must be applied slowly with a hand gun to all lubrication fittings every 500 hours of operations with multi-purpose grease, NLGI #2. Do not over-grease. Applications involving very high or low temperatures may require other types of lubrication. Consult factory with specific lubrication questions.

CLEANING PUMP: Keep pump as clean as possible. This will facilitate inspection, adjustment and repair work and help prevent overlooking a dirt covered grease fitting.

STORAGE: If pump is to be stored, or not used for six months or more, pump must be drained and a light coat of non-detergent SAE 30 weight oil must be applied to all internal pump parts. Lubricate fittings and apply grease to pump shaft extension. Corken suggests rotating pump shaft by hand one complete revolution every 30 days to circulate the oil.

SUGGESTED REPAIR TOOLS: The following tools must be available to properly repair Corken Vane Pumps. These tools are in addition to standard mechanics' tools such as open end wrenches, pliers, screw drivers, etc. Most of the items can be obtained from an industrial supply house.

1. Soft face hammer
2. Snap ring pliers (for Integral Gear Reducer)
3. Allen wrench - 7/32"
4. Arbor press

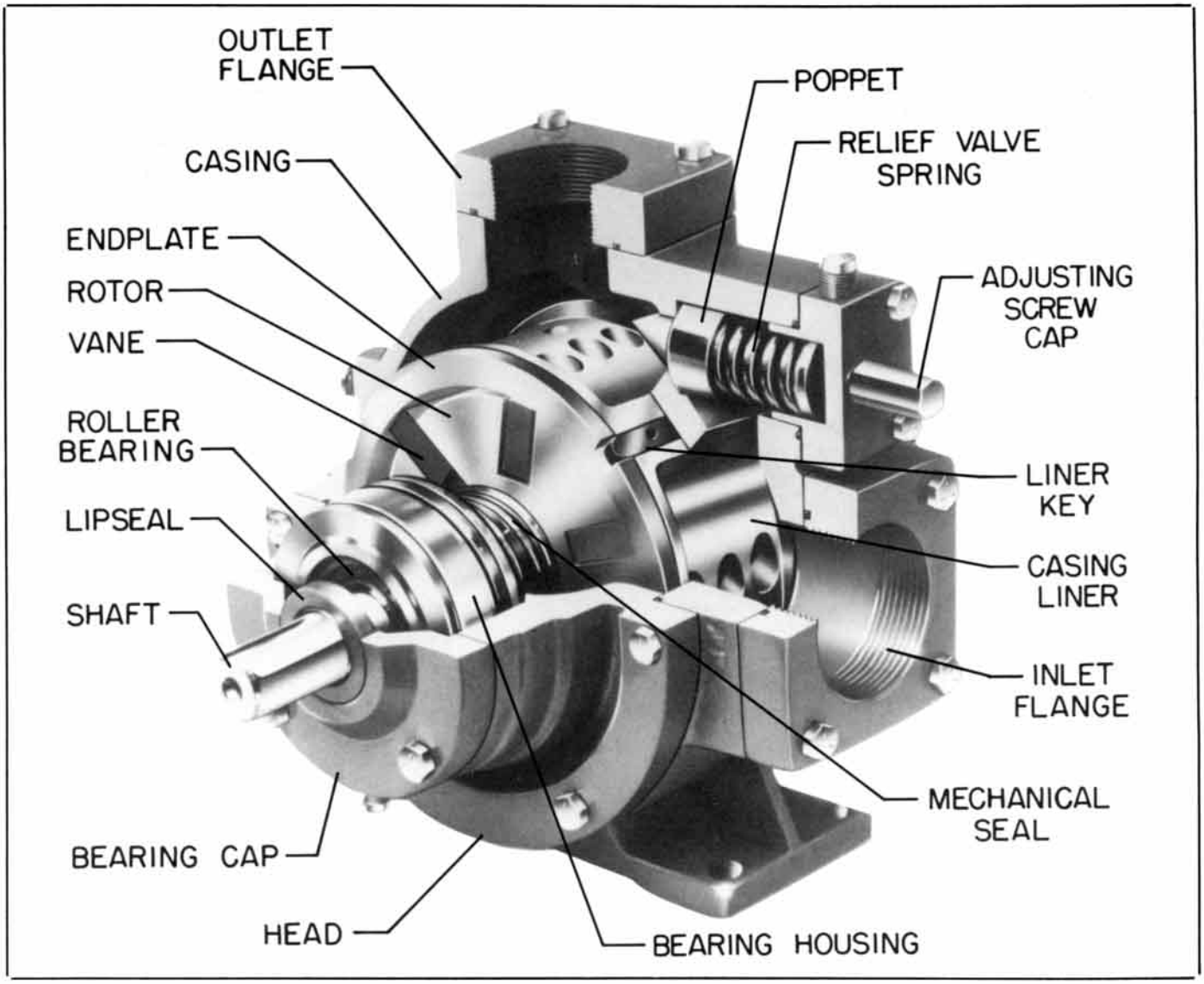

FIGURE 5
Cutaway View Corken Vane Pump

DISASSEMBLY

REMOVING GEAR REDUCER UNITS:

1. On pumps equipped with Integral Reducer Units, (See Figure 7) the reducer can be removed by removing the four lugs which hold the reducer and mounting bracket to the drive end of the pump. Set reducer aside.
2. Remove the splined coupling and snap ring from the pump shaft.

REMOVING BEARINGS AND SEALS:

Since the bearings and seals are identical on each end of the Corken Vane Pumps the following steps would apply to either end for bearing or seal replacement. (See Figure 8)

3. Remove the four capscrews and remove the bearing cap and grease seal. Check condition of grease seal and replace if needed.
4. Remove bearing housing from head. Groove on outside diameter of bearing housing provides means to pry out bearing housing. If difficulty is experienced, remove head and drive out gently with a block of wood.
5. Check roller bearing and shaft for wear. If necessary to replace, remove spiral retaining ring and slide roller bearing from bearing housing.
6. Remove shaft 0-ring and discard it. Never reuse an old O-ring except in an emergency.
7. The adapter plate can be removed using a bearing cap bolt as a puller. (See Figure 9)
8. Remove seal seat and seal seat O-ring from adapter plate. Remove adapter plate O-ring from head.
9. Remove rotating member of seal from shaft. If you are only replacing the seal at this time, go on to Step 9 of assembly.

PUMP PARTS

MODELS CPBN 0521, CPBN 0721, CPBN 1021, CPBN 1321, CPBN 1521

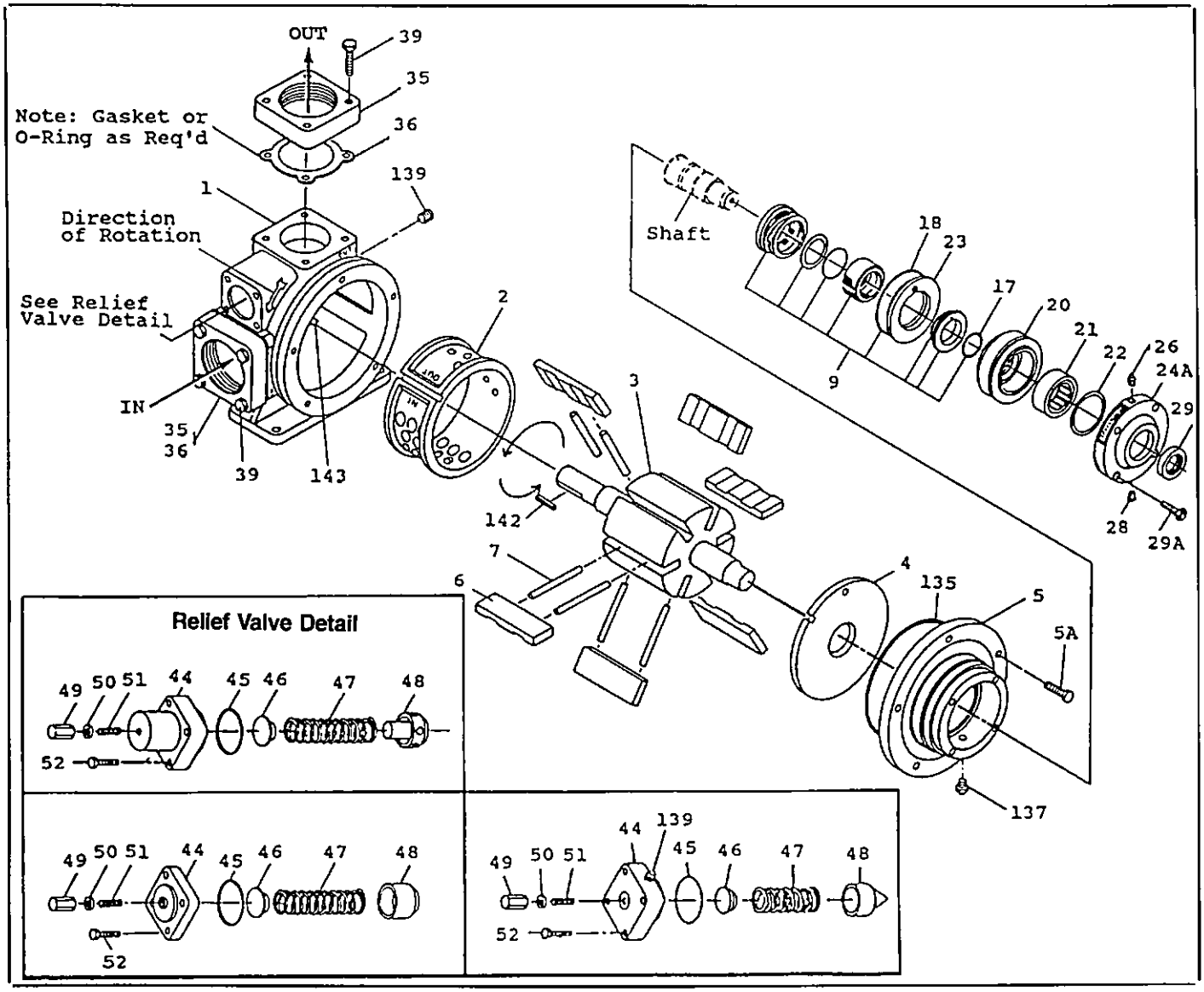

FIGURE 6

Parts Identification (Use for Figures 6 and 6(A))

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Casing	22	Spiral Retainer Ring	47	Valve Spring
2	Casing Liner	23	Adapter Plate	48	Poppet
3	Rotor and Shaft Assembly	24A	Bearing Cap	49	Adjusting Screw Cap
4	Endplate	26	Grease Zerk	50	Gasket
5	Head	28	Relief Fitting	51	Adjusting Screw
5A	Head Capscrews	29	Grease Seal	52	Capscrews for Relief Valve
6	Vanes	29A	Capscrews for Bearing Cap	135	Casing O-ring
7	Pushrods	35	Flanges	137	Relief Fitting
9	Mechanical Seal (complete)	36	Flange Gasket	139	Pipe Plug
17	Shaft O-ring	39	Flange Bolts	142	Shaft Key
18	O-ring (adapter plate)	44	Relief Valve Cover	143	Liner Key
20	Bearing Housing	45	Relief Valve O-ring		
21	Roller Bearing	46	Spring Guide		

PUMP PARTS

MODELS CPBF 0721, CPBF 1021, CPBF 1521

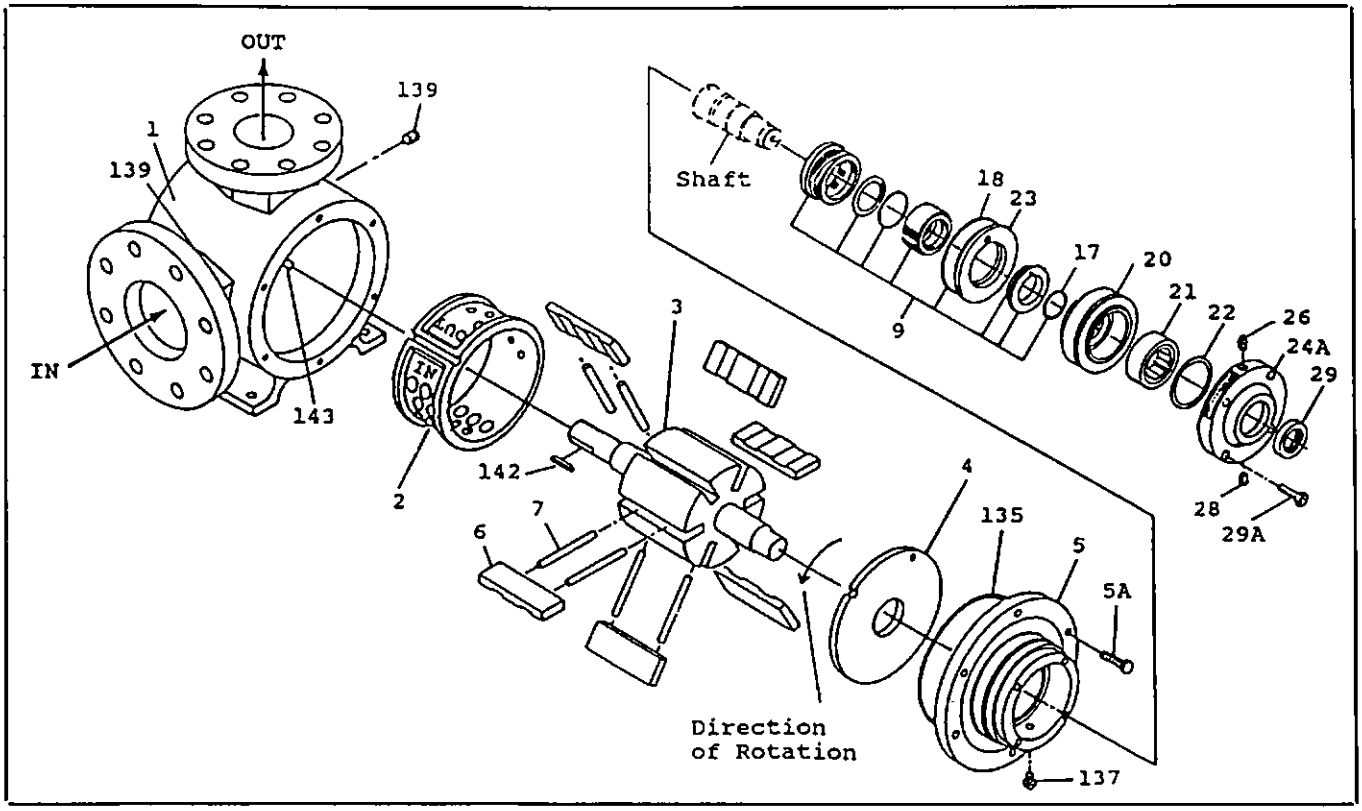

FIGURE 6(A)

DANGER

BEFORE OPENING ANY CORKEN PUMP LIQUID CHAMBER (PUMPING CHAMBER, RESERVOIR, RELIEF VALVE ADJUSTING CAP FITTING, ETC.) BE SURE:

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2. THAT THE DRIVING MEANS (MOTOR, TURBINE, ENGINE, ETC.) HAS BEEN "LOCKED OUT" OR MADE NON-OPERATIONAL SO THAT IT CANNOT BE STARTED WHILE WORK IS BEING DONE ON PUMP.
3. THAT YOU KNOW WHAT LIQUID THE PUMP HAS BEEN HANDLING AND THE PRECAUTIONS NECESSARY TO SAFELY HANDLE THE LIQUID. OBTAIN A MATERIAL SAFETY DATA SHEET (MSDS) FOR THE LIQUID TO BE SURE THESE PRECAUTIONS ARE UNDERSTOOD.

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Sectional View Integral Reducer Units

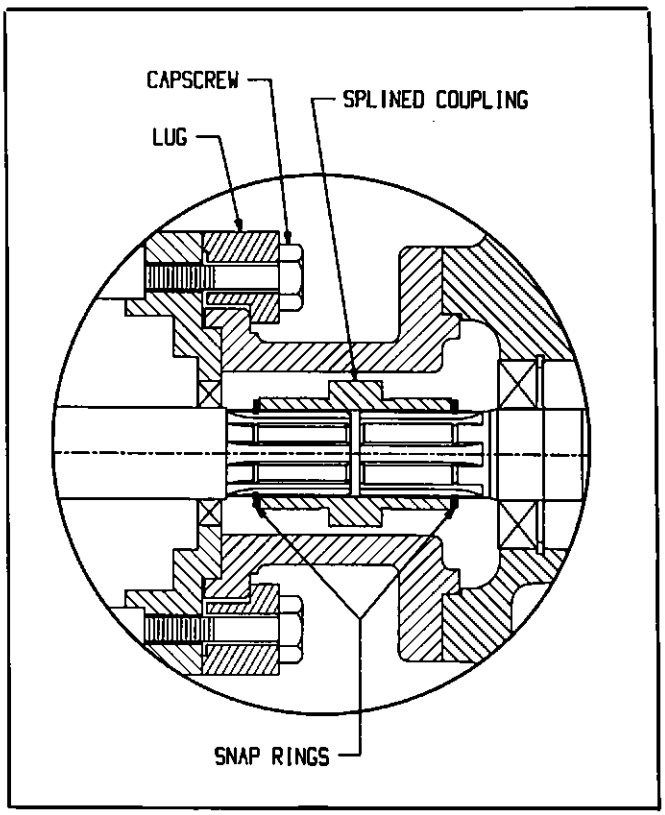

FIGURE 7

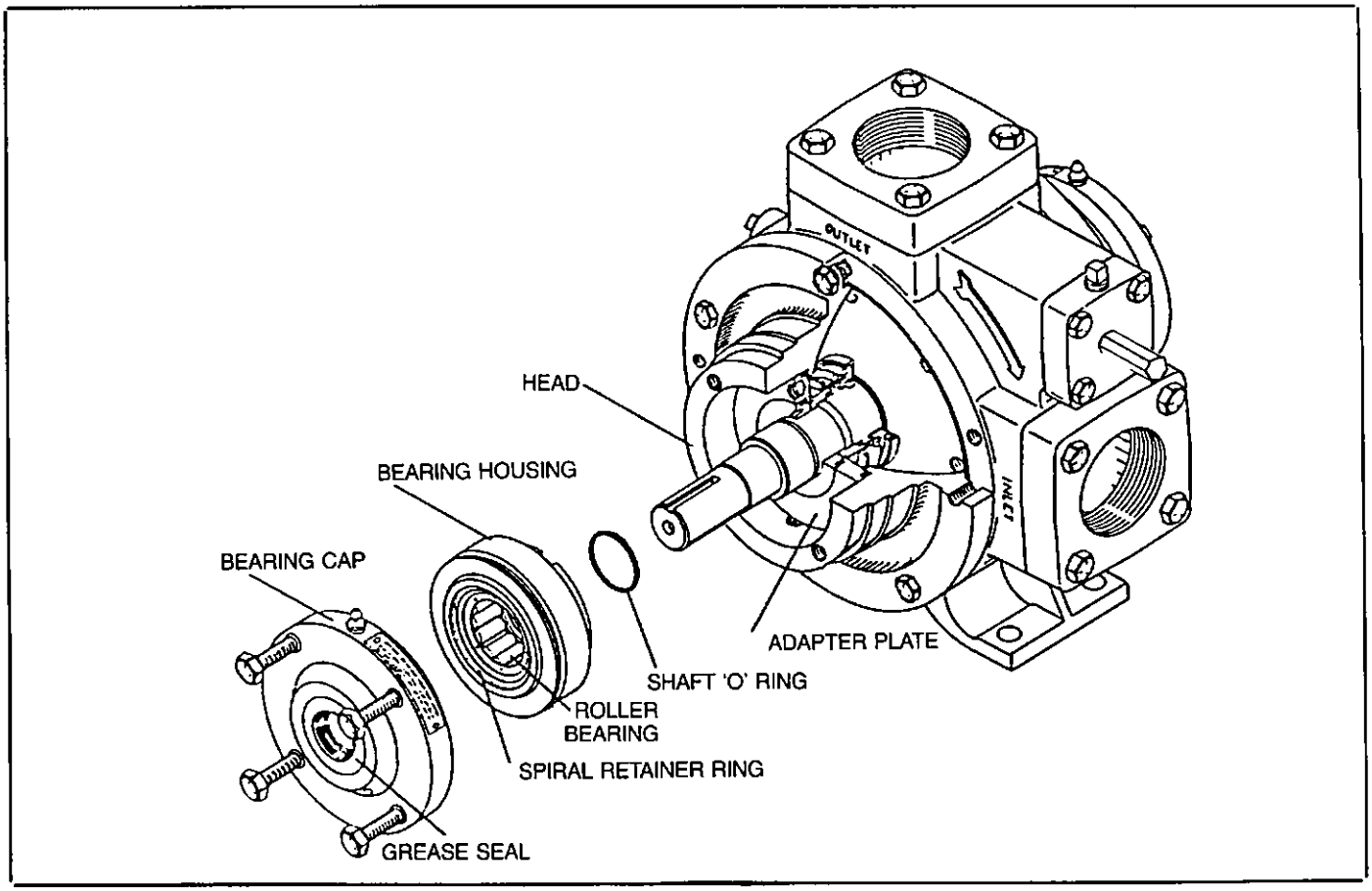

FIGURE 8

REMOVING VANES AND LINER:

Note: To replace vanes and inspect the pump, it is necessary to remove the bearing and seal from other end of pump. Repeat steps 3 thru 9.

10. Remove the head bolts and remove the head.
11. Remove casing O-ring.
12. The endplate can be removed using a head bolt as a puller. Inspect for wear.
13. Carefully take the rotor and shaft out of the pump.
14. Remove vanes and pushrods from rotor. CAUTION: Vanes and pushrods will fall from bottom side of rotor! Inspect vanes and pushrods for wear.
15. Inspect endplate on other end of pump. If worn, remove head and replace or turn around. The end plate is symmetrical and can be turned to provide new wear surface.
16. Inspect casing liner for wear. Casing liner can be removed by sliding it out either end of the casing.
17. Thoroughly clean and inspect all parts for wear or damage and replace if necessary.

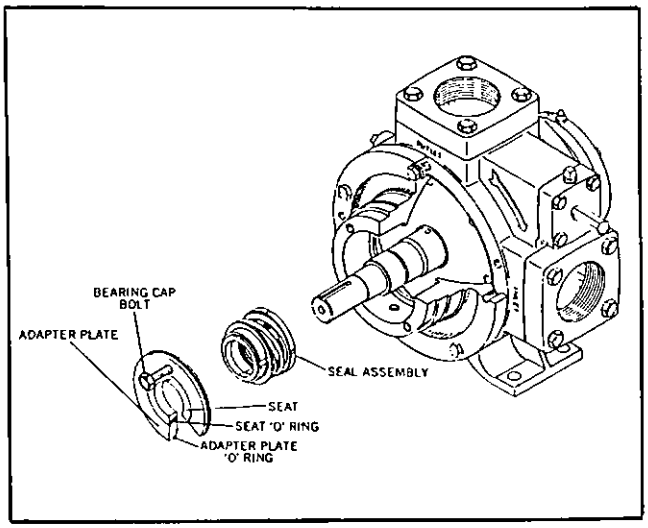

FIGURE 9

DANGER

BEFORE STARTING PUMP, BE SURE ALL DRIVE EQUIPMENT GUARDS ARE IN PLACE.

FAILURE TO PROPERLY MOUNT GUARDS MAY RESULT IN SERIOUS INJURY OR DEATH.

ASSEMBLY

1. Reinstall the liner. The word "outlet" or "discharge" is cast on the outside of the liner. Install liner with the word "outlet" or "discharge" toward the outlet part of the pump.
2. Install three vanes in bottom of rotor holding in place with palm of your hand. Because of the weight of the rotor and shaft on the larger pumps, install end of rotor in casing liner to help support the weight of the rotor.

   Make sure the vanes are installed properly, slots must face direction of rotation.
3. Install the pushrods in from the top of the rotor while holding the vanes in place.
4. Guide the rotor and shaft back into position in the casing and liner.
5. Slide in the remaining three vanes from the end of the rotor making sure the slots are facing the direction of rotation. See Figure 10.

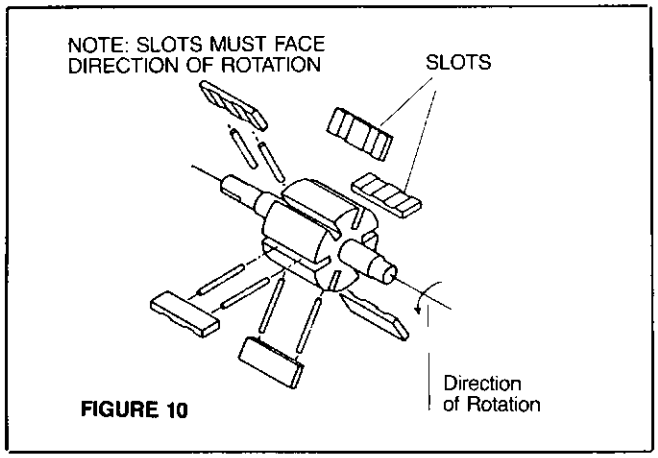

FIGURE 10

NOTE: The following assembly steps apply to both ends of the vane pump.

6. Install end plate. The end plate is symmetrical and can be turned to provide a new wear surface.
7. Place new casing O-ring on head and install, making sure vent connection is located down.
8. Install and tighten head bolts, making sure rotor still turns freely.

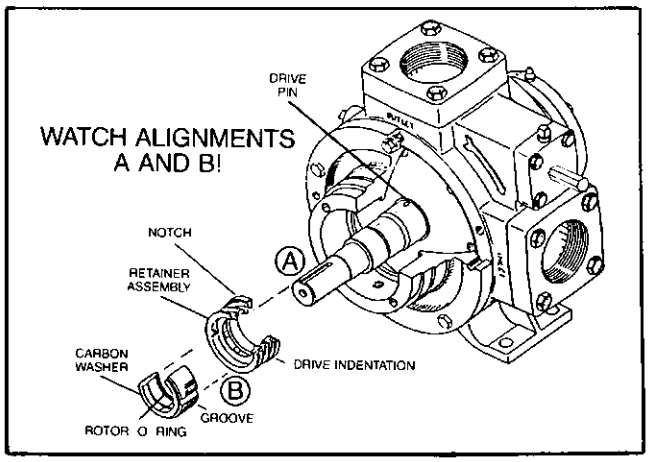

FIGURE 11

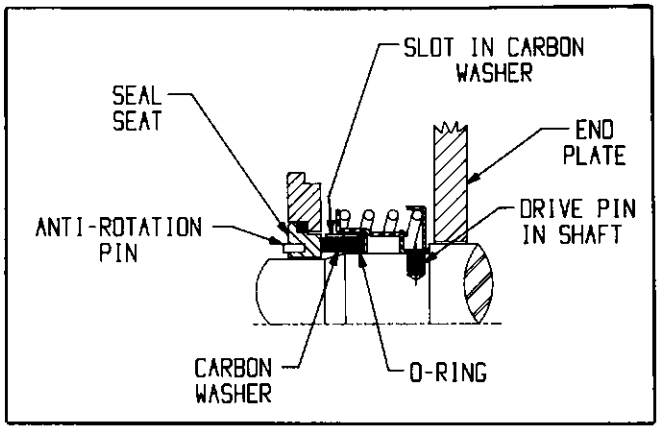

FIGURE 12

INSTALLING MECHANICAL SEAL:

9. Install retainer assembly. See Figs. 11, 12 and 13. Align notch on inside of retainer assembly with drive pin on shaft. Be sure retainer assembly is aligned with drive pin and is pushed up against step on shaft.
10. Lubricate the carbon washer O-ring and shaft. Align the two grooves in carbon washer with the drive indentation in the retainer assembly and gently slide into place.

OPTIONAL TEFLON SEAL:

The teflon seal is the same except for the elastomers. After lubricating the teflon seal ring, install carbon washer and teflon seal ring as shown in Figure 13.

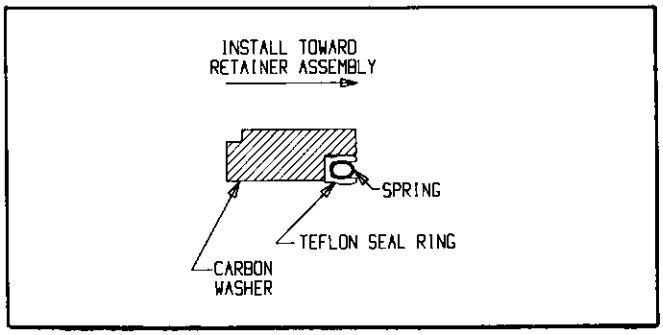

FIGURE 13

11. Oil and insert new adapter plate O-ring into pump head.
12. Oil and insert new O-ring on the seal seat.
13. Install seal seat into adapter plate. Be sure seal seat and carbon washer are clean. Lubricate both lapped faces with clean oil.
14. Install adapter plate assembly into pump head.
15. Place shaft O-ring on shaft.
16. Slide new roller bearing into bearing housing. Install spiral retainer ring into groove of bearing housing.
17. Slide bearing housing assembly into head.(See Figure 14) Locate the slot in bearing housing over the pin in back of seal seat. If pin is not in slot, the seal will not be properly positioned and will leak.
18. Install bearing cap with grease zerk on top.

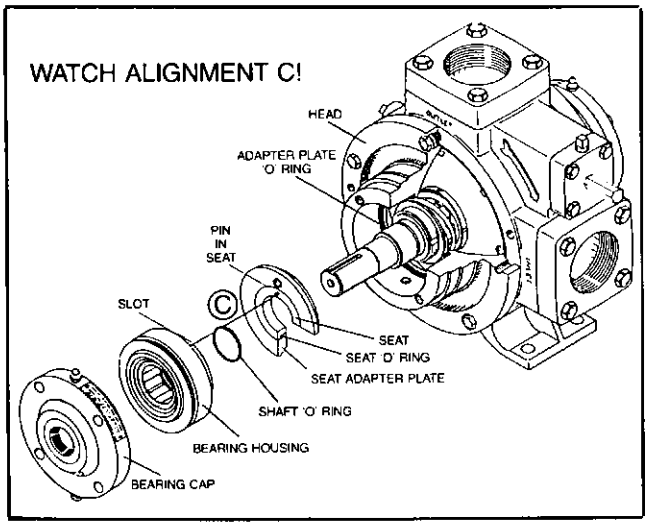

FIGURE 14

19. Install the four bearing cap bolts and tighten. Make sure pump still turns freely.
20. Grease both roller bearings slowly with grease gun until grease comes out relief fitting. A good grade of multi-purpose lithium base grease, NLGI #2 is recommended.

DANGER

BEFORE STARTING PUMP, BE SURE ALL DRIVE EQUIPMENT GUARDS ARE IN PLACE.

FAILURE TO PROPERLY MOUNT GUARDS MAY RESULT IN SERIOUS INJURY OR DEATH.

INTEGRAL REDUCER UNITS:

(Refer to Figure 7)

21. On pumps fitted with integral reducer the shaft snap ring and splined coupling should be installed on pump shaft.
22. Install reducer and mounting bracket on pump. Assemble reducer to pump using the four mounting lugs and capscrews.
23. Pivot the reducer for desired center height with driver shaft and tighten mounting lugs.
24. Align reducer and driver shafts. Be sure reducer is filled with oil as noted on reducer nameplate.

PRESSURE RELIEF VALVE INSTRUCTIONS:

SETTING THE INTERNAL RELIEF VALVES

Internal relief valves should be set to open at a higher pressure than external relief valve present in the system.

Internal relief valves are not available on CPBF or CPGF series pumps and some means of pressure protection, (inline pressure relief valve, torque limiting device, etc.) must be provided.

The internal relief valve is set at the factory at 125 psi, (100 psi on sizes 1321 and 1521).

Relief Valve adjustment. (See Figure 15)

1. Remove the adjusting screw cap and gasket.
2. Turn the adjusting screw *clockwise* to *increase* the pressure; *counter-clockwise* to *decrease* the pressure.
3. Replace the cap and gasket.

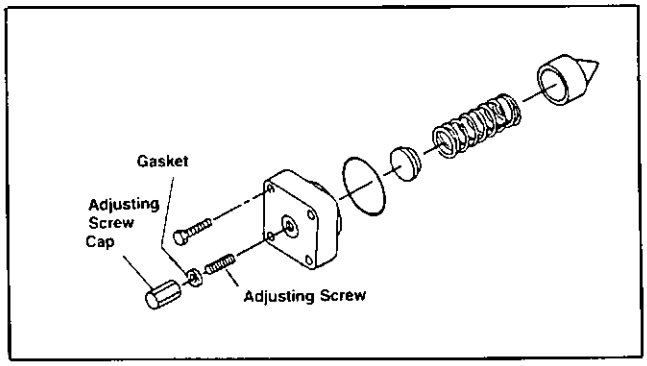

FIGURE 15